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RESEARCH PAPER

Genotypic Association and Path Co-efficient Analysis in Ashwagandha [*Withania Somnifera* (L.) Dunal]

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ABSTRACT : To study genotypic and phenotypic correlation and path co-efficient for seven characters were studied in 34 different local genotypes of ashwagandha. Results indicated that root yield was significantly and positively correlated associated among themselves except root branches with seed yield. Path co-efficient analysis showed highest positive direct and indirect effect of plant height and stem branches on root yield. Indirect effects of other component characters were high through plant height and stem branches on root yield. Selection for high plant height and stem branches appeared to be useful for improving root yield.

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KEY WORDS :

Correlation co-efficient, Path co-efficient, (*Withania somnifera*)

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Ashwagandha one of the important medicinal plants is being used in traditional indian medicinal plants against many human diseases since ancient times the whole plant especially roots and leaves of Ashwagandha are found enriched with various medicinal properties. The plant contain many alkaloids and withanolids. It is most effective on various system namely nervous system, digestive, urinary circulatory and reproductive system (Jadhav, 2003). Though Ashwagandha is important medicinal crop in india, very little work has been done in Maharashtra to study varietal characters and to improve the root yield. An attempt was made to study correlation and path co-efficient analysis of various growths and yield parameters in Ahwagandha.

RESEARCH METHODOLOGY

The experiment was conducted at Medicinal and Aromatic Plant Project, MPKV, Rahuri Dist. Ahmendagar (M.S.) during early *Rabi* 2013. The experimental material comprised 34 different local genotypes of Ashwagandha along with two promising checks. The trial was laid out in Randomized Block Design with two replications with plot size 4.5 x 3.60 M. Rows were spaced in 45 cm apart with plant to plant distance 20 cm.

Data were recorded for seven characters on 10 randam selected plants from each treatment in each replications and average were work out. Phenotypic genotypic correlation co-efficient were studied (Singh and Chaudhari, 1977) alongwith path co-

efficient analysis (Dewey and Lu, 1959).

RESULTS AND DISCUSSION

The genotypic and phenotypic correlation co-efficients are presented in Table 1. These analysis revealed that the genotypic correlation co-efficient (rg) were generally higher than the corresponding phenotypic correlation co-efficient (rp). Root yield was significantly and positively associated with all the component traits, except root branches at phenotypic level. Significant positively associations were observed among the all component characters except between root branches and seed yield.

Plant height showed highly significant positive association with root yield and all other components except root branches. This significant correlation could be explained by the direct effect of plant height and indirect effect through stem branches (Table 2). Indirect effects via other component characters were mostly negative. Stem branches shows highly significant and positive association with root yield other characters. Which would again be explain by its positive direct effects and indirect effect through plant height on root yield. Although root diameter was significantly and positively associated with root yield and other components, except root branches, it had smaller positive direct effect and more positive indirect effect through plant height and stem branches. It had highest negative indirect effect on root yield via root length. The result of the present investigations are in agreement the findings of Kubsad

Table 1 : Genotypic (rg) and phenotypic (rp) correlation co-efficient for seven characters in Aswagandha

Characters	Stem branches	Root length	Root diameter	Root branches	Seed yield	Root yield
Plant height						
rg	0.92	0.69	0.84	0.38	0.48	1.11
rp	0.72**	0.58**	0.79**	0.40**	0.52**	0.76**
Stem branches						
rg	--	0.62	0.77	0.51	0.68	0.76
rp		0.53**	0.69**	0.40**	0.58**	0.63**
Root length						
rg	--	--	0.52	0.34	0.56	0.56
rp			0.59**	0.68**	0.47**	0.49**
Root diamond						
rg	--	--	--	0.30	0.50	0.89
rp				0.46**	0.44**	0.77**
Root branches						
rg	--	--	--	--	0.05	0.38
rp					0.36	0.32
Seed yield						
rg	--	--	--	--	--	0.52
rp						0.47**

Table 2 : Direct and indirect effects of plant characters on root yield of Ashwagandha

Characters	Plant height	Stem branches	Root length	Root diameter	Root branches	Seed yield	Genotypic correlation with root yield
Plant height	1.40	1.32	-1.40	0.23	-0.39	-0.14	1.06
Stem branches	1.17	1.68	-1.30	0.30	-0.89	-0.18	0.76
Root length	1.03	1.03	-1.98	0.18	0.56	-0.17	0.60
Root diameter	1.10	1.25	-1.03	0.33	-0.58	-0.16	0.91
Root branches	0.33	0.92	0.68	0.10	-1.67	-0.01	0.39
Seed yield	0.62	1.14	-1.10	0.19	-0.04	-0.26	0.52
Residual effect		0.21					

et al., 2009 in Ashwagandha.

The root length and seed yield showed significant positive correlation with root yield and its component traits except root branches in both the cases. The direct both characters were negative but the former had highest negative effect of stem branches and plant height. Rahane 2011 reported that root length and days to 50 per cent flowering had high positive direct effect on dry root yield per plants. Root branches showed significant positive genotypic association with root yield and other components except seed yield. Although the direct effect of root length and plant height contributed towards the significant positive correlation co-efficient between root branches and root yield. The residual effects were considerably high.

These results indicate that plant height and stem branch had strong positive association with root yield and also showed highest positive direct effect on root yield. They also showed highest positive contribution through indirect effect of other components traits showing positive association with root yield. Thus direct selection for plant height and stem branches will increase the breeding co-efficient for root yield in ashwagandha.

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